Watershed: **Yuba River**

Years Sampled: **2008-2014**

Study Objectives:

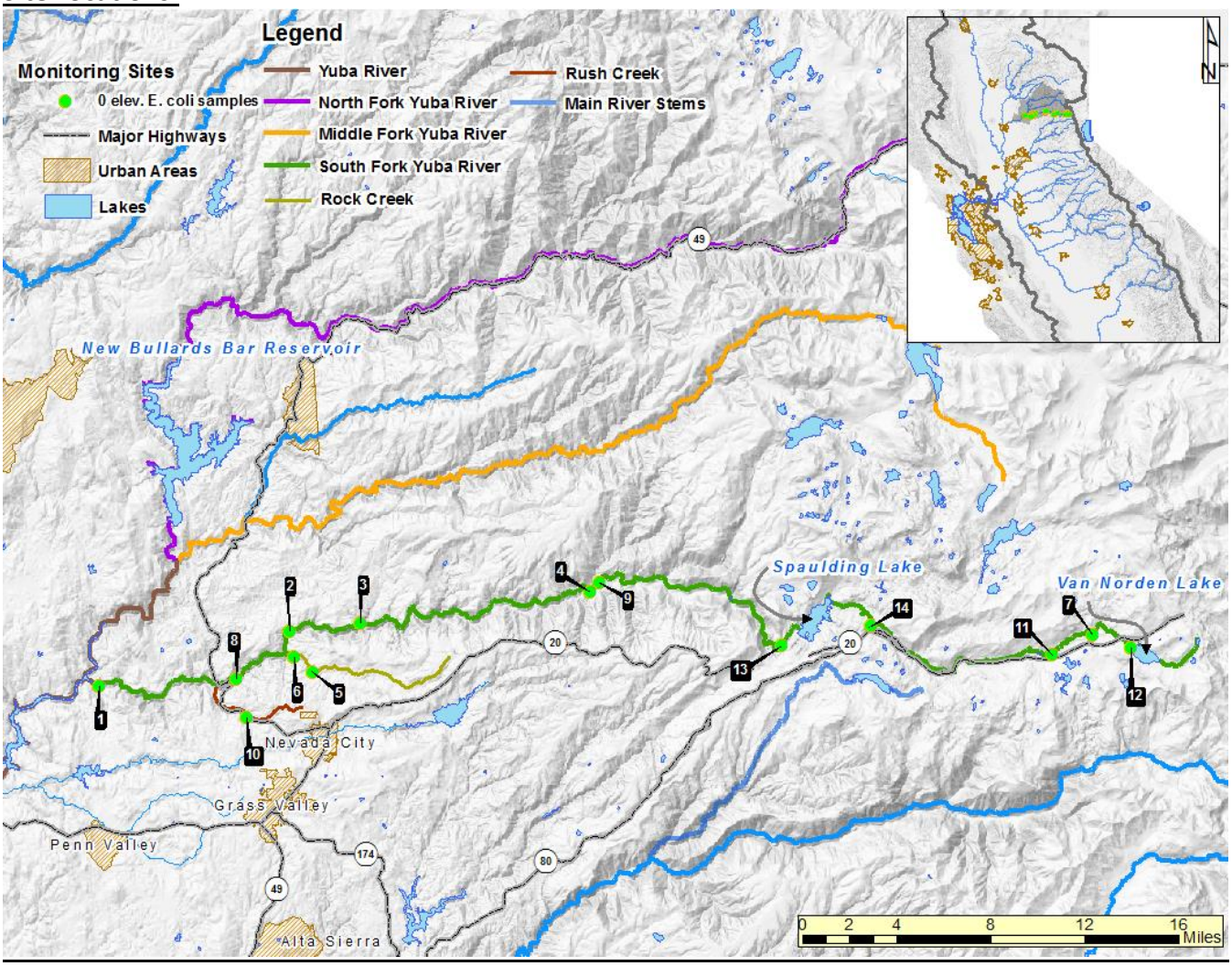
1. Is there any evidence that beneficial uses are being impacted, and if so, what are potential contributors?
2. Are there any noticeable regional, seasonal or trends observed in the water quality data?
3. What are pathogen concentrations at selected monitoring sites?

KEY STATISTICS

Number of sites sampled	**14**
Sampled by	**Water Board Staff (Sac)**
	South Yuba River Citizens League
Number of sites sampled for pathogens	**3**
Number of total samples	**147**
Sampling Frequency	**2x/mo. (May-Sept.)**
Assessment Threshold	**320 MPN/100 mL**

Message: **None of the 147 samples indicate elevated *E.coli,* however one site has tested positive for pathogens.**

Site Locations:



Summary of Results:

Table 1: Field Measurements

Station Code	Map #	Station Name	Oxygen, Dissolved (mg/L)		pH		SpConductivity (uS/cm)		Temperatiure (˚C)		Turbidity (NTU)	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
516NEV900	1	YR, S Fork at Bridgeport	6.40	8.80	7.30	8.40	80.0	620.0	20.70	25.40	0.02	0.11
516NEV901	2	YR, S Fork at Purdon Crossing	6.80	8.30	6.90	8.40	80.0	570.0	20.10	25.87	0.21	5.20
516NEV902	3	YR, S Fork at Edwards Crossing	7.40	9.51	7.10	8.40	87.0	120.0	15.69	24.80	0.23	1.11
516NEV903	4	YR, S Fork Below Washington	11.90	11.90	6.90	7.77	70.0	153.0	14.86	22.70	0.68	2.96
516NEV904	5	Rock Creek Above Lake Vera	NR	NR	7.00	7.20	80.0	80.0	22.60	24.70	NR	NR
516NEV905	6	Rock Creek Below Lake Vera	NR	NR	7.60	7.70	10.0	90.0	18.00	20.10	NR	NR
516NEV910	7	YR, S Fork below Towle Mountain Road	6.20	11.73	7.10	8.55	20.0	50.0	11.30	23.40	0.08	1.19
516NEV911	8	YR, S Fork at HWY-49	6.90	9.51	7.90	8.30	82.7	153.0	18.35	26.40	0.28	2.96
516NEV912	9	YR, S Fork at Washington	7.57	9.59	7.59	7.79	70.0	89.1	15.29	22.26	0.17	3.05
517NEV109	10	Rush Creek, at Rush Creek Way	7.10	7.60	7.40	7.80	270.0	320.0	16.70	18.80	0.37	0.50
517NEV110	11	YR, S Fork at Plavada	7.00	9.20	7.10	7.20	20.0	220.0	8.90	22.50	0.13	0.29
517NEV111	12	YR, S Fork at Van Norden Dam	7.20	8.60	6.40	7.50	20.0	320.0	12.10	22.40	0.29	0.70
517SFYEPS	13	YR, S Fork at Emerald Pools	7.78	9.55	7.20	7.83	63.0	127.0	11.54	17.62	0.09	1.98
517SFYISC	14	YR, S Fork at Indian Springs Campground	7.43	9.76	7.45	8.46	41.0	87.0	11.63	19.78	0.24	4.19

YB: Yuba River, S: South, NR: Not Recorded

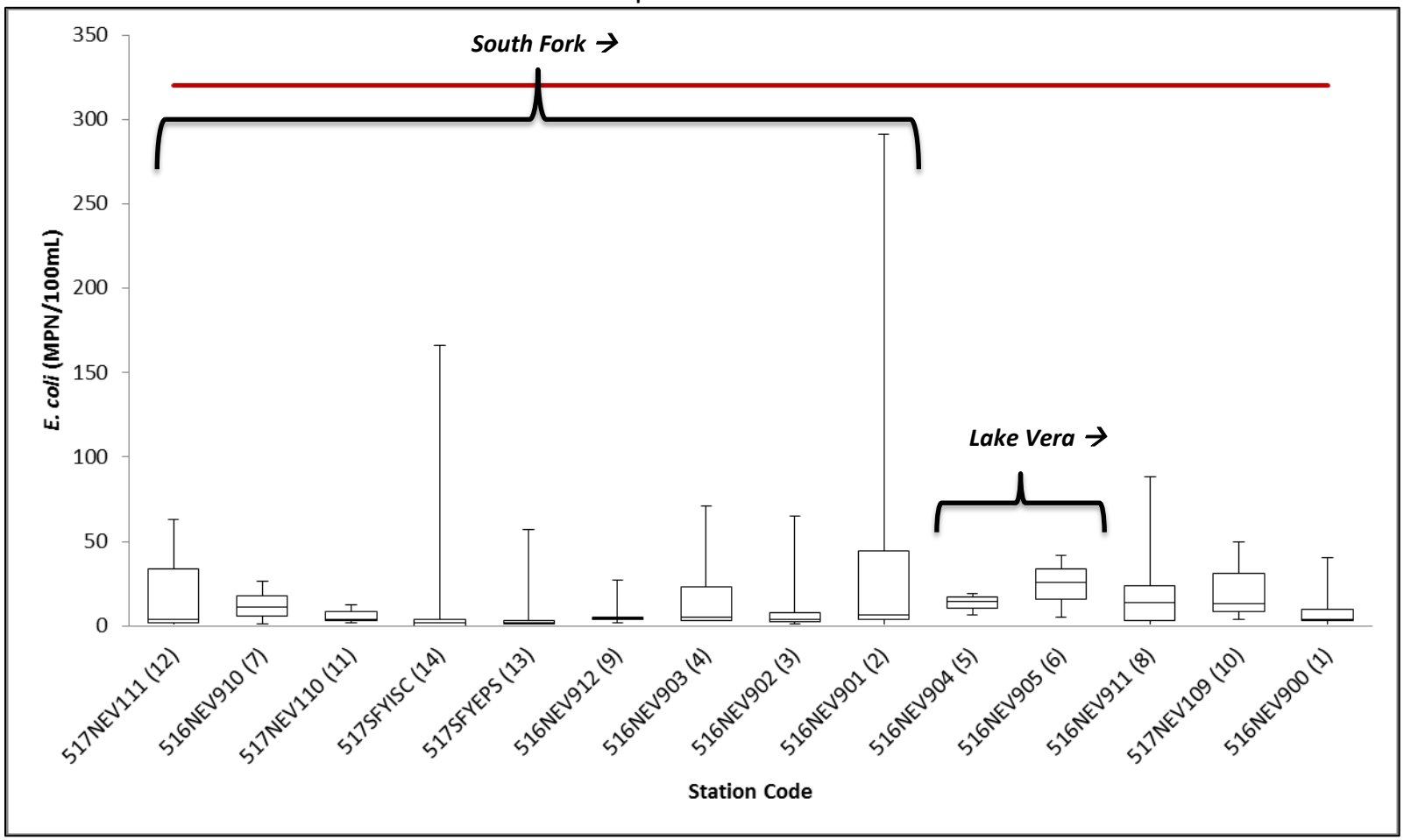
Table 2: *E. coli* and Pathogen Results

Map #	*E. coli* (MPN/100ml)					*Cryptosporidium* (cysts/L)			*Giardia* (oocysts/L)			*Salmonella* (MPN/100mL)			*E.Coli* O157:H7 (Presence/Absence)		
	Mean	Min	Max	Count	>320	Max Result	Count	(+)	Max Result	Count	(+)	Max Result	Count	(+)	Result	Count	(+)
1	7.8	<1.0	40.4	15	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
2	46.8	<1.0	290.9	15	0	Not Detected	1	0	Not Detected	1	0	2.2	1	1	Not Detected	1	0
3	8.9	1.0	65.0	15	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
4	21.2	3.1	71.2	4	0	Not Detected	1	0	Not Detected	1	0	Not Detected	1	0	Not Detected	1	0
5	13.3	6.3	18.9	3	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
6	24.2	5.2	41.4	3	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
7	12.3	1.0	26.2	4	0	Not Detected	1	0	Not Detected	1	0	Not Detected	1	0	Not Detected	1	0
8	17.8	<1.0	88.0	22	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
9	5.6	2.0	27.2	18	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
10	22.2	4.1	49.5	3	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
11	6.1	2.0	12.1	3	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
12	22.4	<1.0	63.1	3	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
13	5.6	<1.0	57.3	18	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0
14	20.5	<1.0	166.4	9	0	NA	0	0	NA	0	0	NA	0	0	NA	0	0

E. coli - Highlighted Cells: Exceeds EPA Guidline of 320 MPN/100ml

Pathogens - (+): positive result, Highlighted Cells: positive results, NA: Not Applicable

Graph 1: *E Coli* Results



12,7,11,14,13,9,4,3,2 = progressive DS flow along South Fork (above Rock Creek confluence); 5,6 = progressive DS flow along Lake Vera

WHAT IS THE MEASURE SHOWING?

Once the site of extensive hydraulic mining, the Yuba River is comprised of North, Middle, and South Forks which converge at Englebright Lake and empty into the Feather River. The South Fork can be traced to Donner Pass, and is impounded at Van Norden Lake and Spaulding Lake, the latter of which is dammed. Draining northwest into this fork from Nevada City are Rush Creek and Rock Creek. The sites located in the Yuba watershed, on the South Fork of the Yuba River, are northeast of Nevada City. Field measurements for each site are shown in Table 1.

Results show that 0 of the 135 samples exhibited elevated levels of *E.coli* (shown in Table 2). All of the results are well below the EPA recommended guideline of 320 MPN/100 mL.

The watershed is primarily forest (Jin et al., 2013), yet potential non-point and urban sources are abundant. It is heavily utilized for recreational activities, and is home to numerous waterfowl and other wildlife.

Three sites in the South Yuba River sub watershed were sampled for pathogenic *E. coli* O157:H7, *Cryptosporidium*, *Giardia*, and *Salmonella*. One of the sites tested positive for pathogens (shown in Table 2). There are currently no water quality objectives for these constituents

WHY THIS INFORMATION IS IMPORTANT?

In 2012, the USEPA amended recreational water quality guidelines for human health under the Clean Water Act, specifying the standard threshold value (STV) for the indicator bacteria *E. coli* as 320 colony-forming units (CFU) per 100 milliliters (mL). The STV represents the 90% percentile of the water quality distribution, beyond which the water body is not recommended for recreation (Nappier & Tracy, 2012).

E. coli is an indicator of potential fecal contamination and risk of illness for those exposed to water (e.g. when swimming). Since *E. coli* is only an indicator of potential pathogens and does not necessarily identify an immediate health concern, the data collected from this study provide more information on pathogen indicators as well as specific water-borne pathogen concentrations to better assess their impact on the beneficial use of recreation and to identify potential contributors by sub watershed.

WHAT FACTORS INFLUENCE THE MEASURE?

E. coli and specific water-borne pathogens can come from human or animal waste and may be highly mobile and variable in flowing streams. In addition to human recreational use, the presence of pathogens in water may be the result of cattle grazing, wildlife, urban and agricultural runoff, or sewage spills. The physical condition of the watershed may also influence pathogen measurements, however in this study field measurements (temperature, SC, DO, turbidity and pH) were variable between sites and it is unclear if these constituents had an effect on the *E. coli* or pathogen measurements.

TECHNICAL CONSIDERATIONS:

- Data available at: CEDEN
- *E. coli* is only an indicator of potential pathogens and does not necessarily identify an immediate health concern.
- Public reports and fact sheets are available at: http://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_studies/surface_water_ambient_monitoring/swamp_regionwide_activities/index.shtml

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Nappier, Sharon, Tracy Bone. 2012 Recreational Water Quality Criteria. Environmental Protection Agency [Internet]. Sacramento, CA. c2012 – [cited January 2015]. Available from: http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/upload/factsheet2012.pdf